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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/039,612	12/31/2001	Howard S. David	42390.P13874	2520

8791 7590 03/26/2004

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EXAMINER

LI, ZHUO H

ART UNIT	PAPER NUMBER
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2186

DATE MAILED: 03/26/2004

6

Please find below and/or attached an Office communication concerning this application or proceeding.

P24

Office Action Summary

Application No.

10/039,612

Applicant(s)

DAVID, HOWARD S.

Examiner

Zhuo H. Li

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 31 December 2003.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1,3-6,8-10 and 12-15 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1,3-6,8-10 and 12-15 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 31 December 2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____.
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date _____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____.

DETAILED ACTION

Drawings

1. The amended drawings were received on 12/30/2003 (paper no. 5). These drawings are acceptable.

Claim Rejections - 35 USC § 103

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

3. Claims 1, 3-6, 8-10 and 12-15 are rejected under 35 U.S.C. 103(a) as being unpatentable over Westberg (US PAT. 5,361,391) in view of Vondran, Jr. (US PAT. 6,480,938 hereinafter Vondran).

Regarding claim 1, Westberg discloses a memory controller (14, figure 1) comprising an array of tag address storage locations (30a and 30b, figure 2), and a control logic (28, figure 2) read as a command sequencer and serializer unit coupled to the array of tag address storage locations (figure 2), the control logic to control a data cache (32a, figure 2) located on a memory module (16, figure 2), the memory module (16, figure 2) coupled to the memory controller (14, figure 2) via a data bus (24, figure 1). In addition, Westberg teaches the memory module located with the main memory (18, figure 1) so that it recognizes the memory module coupled to the

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memory controller via a memory bus (26, figure 1) instead of the data bus (col. 3 line 18 through col. 32). Westberg differs from the claimed invention in not specifically teaching each tag address storage location in the array of tag address storage locations corresponding to a cache line divided into two segments. However, Vondran teaches an efficient cache structure to make easily scale to support multiple clusters having each tag address location in an array of tag address storage location corresponding to a cache line divided into two segments (figure 5 and col. 10 lines 1-22). Therefore, it would have been obvious to a person of ordinary skill in the art at the time the invention was made to modify Westberg in having each tag address storage location in the array of tag address storage locations corresponding to a cache line divided into two segments, as per teaching of Vondran, in order to make easily scale to support multiple clusters.

Regarding claim 3, Westberg discloses the memory controller further comprising a plurality of tag address storage locations, each of the plurality of arrays of tag address storage locations corresponding to one of a plurality of memory modules (col. 4 lines 34-46).

Regarding claims 4-5, Vandran teaches to organize each of the plurality of arrays of tag address storage location into a plurality of ways, i.e., 4 ways (col. 10 lines 8-22).

Regarding claim 6, Westberg discloses a memory module (16, figure 1) comprising a memory device and a data cache coupled to the memory device, the data cache controlled by commands delivered by a memory controller (14, figure 1) over an address bus (22, figure 1), the memory controller component including an array of tag address storage locations (30a, figure 2). In addition, Westberg teaches the memory module located with the main memory (18, figure 1) so that it recognizes the memory module coupled to the memory controller via a memory bus

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(26, figure 1) instead of the address bus (col. 3 line 18 through col. 32). Westberg differs from the claimed invention in not specifically teaching each tag address storage location in the array of tag address storage locations corresponding to a cache line divided into two segments.

However, Vondran teaches an efficient cache structure to make easily scale to support multiple clusters having each tag address location in an array of tag address storage location corresponding to a cache line divided into two segments (figure 5 and col. 10 lines 1-22).

Therefore, it would have been obvious to a person of ordinary skill in the art at the time the invention was made to modify Westberg in having each tag address storage location in the array of tag address storage locations corresponding to a cache line divided into two segments, as per teaching of Vondran, in order to make easily scale to support multiple clusters.

Regarding claims 8-9, the limitations of the claims are rejected as the same reasons set forth in claims 4-5.

Regarding claim 10, the limitations of the claim are rejected as the same reasons set forth in claims 1 and 6.

Regarding claim 12, the limitations of the claim are rejected as the same reasons set forth in claim 3.

Regarding claims 13-14, the limitations of the claims are rejected as the same reasons set forth in claims 4-5.

Regarding claim 15, Westberg discloses a point-to-point interconnect to coupled the memory controller to the memory module (figures 1-2).

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Response to Arguments

4. Applicant's arguments with respect to claims 1, 3-6, 8-10 and 12-15 have been considered but are moot in view of the new ground(s) of rejection.

Conclusion

5. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

6. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Zhuo H. Li whose telephone number is 703-305-3846. The examiner can normally be reached on Tue-Fri 9:00 a.m. to 6:30 p.m..

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If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Matthew Kim can be reached on 703-305-3821. The fax phone number for the organization where this application or proceeding is assigned is (703) 872-9306.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-305-3900.

Zhuo H. Li
March 17, 2004



MATTHEW KIM
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 2100